

## Summary

### **Airtightness of pur areas – planing and measuring in clinical areas**

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#### Introduction

What is a pure area? In the case of the production of smallest structures, e.g. in production of microprocessors, or in the clinical range, e.g. in operating rooms, momentous problems can arise as a result of impurities in air.

The only solution of this problem exists in the relocation of production, or the hygienically relevant ranges of medicine and research into a particle-free environment. Such is made available by so-called pure areas. The pure areas built for this purpose, are thus ideally airtight areas, which receives the necessary fresh air over a multi-level filter system in an almost dust and germ-free quality

#### Initial position

Reason for the airtightness measurement in the new building of a German university hospital, which already was in use, was the fact, that the necessary differential pressure was not to be reached, which should be developed between the individual areas.

During the regulation of the ventilation system the technicians noticed, that the necessary differential pressure was not to be reached or only with a strongly increased achievement of the ventilation system.

For this reason our company was commisioned by the consultant to carry out an examination of the airtightness of the individual areas. At the same time also the ventilation system was examined for its airtightness.

#### The results

The measurement of the first operating room resulted in a large surprise: The change of air was measured with a n50 of 26 (twenty-six!). During the leakage detection an unbelievable number of lack within the range of the panelling and ceiling liners was noticeable.

Besides it was stated in the context of the examination of the ventilation system, that substantial leakages of the air ducts distributed the inserted pure air over the suspended ceiling and so provided a not constant pressure in the individual areas.

#### Results

For the planning and execution of pure areas some conclusions can be pulled from the presented measurement. In detail the following points are to be particularly considered:

- The minimization of the built leakages is in principle a substantial condition in the building of pure areas.
- A systematic quality assurance should be accomplished by suitable specialists in each planning and execution phase.
- The planning of pure areas must experience a special attention especially in the detail.
- An extensive documentation of planning and the execution facilitate the later intervention in the plants and their operation sequences.
- A precise quality-related startup and acceptance in connection with an airtightness measurement of the individual areas and an examination of the ventilation system are essential.